Comparison of key skills specifications 2000/2002 with 2004 standardsX015461July 2004Issue 1

edxLogo_RGB

Mark Scheme (Results)

November 2011

GCSE Mathematics (5MM1H)

Paper 01

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel’s centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

November 2011

All the material in this publication is copyright  
© Pearson Education Ltd 2011

**NOTES ON MARKING PRINCIPLES**

**1** All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

**2** Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

**3** All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate’s response is not worthy of credit according to the mark scheme.

**4** Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

**5** Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

**6** Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*

Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select* *and use a form and style of writing appropriate to purpose and to complex subject matter*

Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.

The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

**7** **With working**

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the “correct” answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

**8** **Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

**9** **Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

**10** **Probability**

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

**11** **Linear equations**

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

**12 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

**13 Range of answers**

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

|  |
| --- |
| **Guidance on the use of codes within this mark scheme** |
| M1 – method mark  A1 – accuracy mark  B1 – Working mark  C1 – communication mark  QWC – quality of written communication  oe – or equivalent  cao – correct answer only  ft – follow through  sc – special case  dep – dependent (on a previous mark or conclusion)  indep – independent  isw – ignore subsequent working |

.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | |
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 1 |  | 40–10=30  35–20=15  20+30+15+10+35+40=150  Or  (40+35) x 2 =75 x 2 =150 | 150 | 2 | M1 For adding the four given side lengths and at least one of 15 or 30  40 + 20 + 35 + 10 + 30 + 15 or 135 or 120 seen  Or (40+35) x 2  A1 cao |
| 2 | (i) |  | 18.1475 | 3 | B1 cao |
|  | (ii) |  | 18147.5 |  | B1 cao |
|  | (iii) |  | 1.037 |  | B1 cao |
| 3 | (a) | 2 )126 126  3 ) 63 / \  3 ) 21 2 63  7 / \  3 21  / \  126=2 32 7 3 7 | 2 x 32 x 7 | 2 | M1 for a systematic method of at least 2  correct divisions by a prime number  or 2 correct division stages on a factor tree  or a full process with one calculation error  A1 2 3 3 7 or 2 32  7 |
|  | (b) | 2 7 | 14 | 2 | M1 for listing factors of 126 and 70 (at least 3 correct for each)  or identification of one common factor or 2 x 7  A1 cao |
|  | (c) | 70, 140, 210, 280…… 630…  126, 252, 378, 504 ……630…  126 = 2 32 7  70 = 2 5 7  2 32 7 5 | 630 | 2 | M1 for listing multiples, at least 3 of each, condone one addition error  70, 140, 210, 280…… 630  126, 252, 378, 504 ……630  A1 for 630 cao  Alternative:  M1 for 2 × 7 × 5 × 3 (× 3)  A1 for 630 |
| **5MM1H\_01** | | | | | |
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 4 | (a) |  | 4 | 1 | B1 cao |
|  | (b) | 14 – 4 – 8=2 | 2 | 3 | M1 for 4 × 2 (=8) blue counters  M1 for 14 – “8” – 4 or 10 – “8”  A1 cao  or  M1 for P(B)= 2 ×  oe ( =  oe)  M1 for 1 –  –  oe or P(Y)=  oe or  × 14 oe A1 cao |
| 5 | (a) |  | Triangle at (2,2),(6,2) and (2,10) | 2 | B2 fully correct answer  (B1 correct enlargement incorrect centre) |
|  | (b) |  | A rotation about (0,0) clockwise through 90 | 3 | B1 Rotation  B1 90° clockwise or 270° (anticlockwise)  B1 for (0,0) or *O* or origin  NB: a combination of transformations gets B0 |
|  | (c) |  | Triangle at (–2,3), (2,3) and  (–2,1) | 2 | B2 fully correct answer  (B1 for any translation) |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | | |
| **Question** | | **Working** | | **Answer** | **Mark** | **Notes** |
| 6 | (i) | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | + | 1 | 2 | 3 | 4 | 5 | 6 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |  |  | 6 | M1 for listing / identifying the 2 outcomes (5,6) and (6,5)  or (x ) + (x)  A1 for  oe |
|  | (ii) |  | | Incorrect and reason |  | M1 for identifying there are 36 outcomes,  eg 36 seen or outcomes listed or shown in a table (can be earned in (i))  M1 for attempt to list or find the number of outcomes giving a total of 5 or more (allow one error, omission or extra outcome),  eg 30 (or 29 or 31) seen or outcomes listed or identified in table.  A1  oe  C1 (dep M2) for conclusion that Savio is incorrect with supportive evidence (including clear reference to their probability for a total of 5 or more).  Alternative  M1 for identifying there are 36 outcomes,  eg 36 seen or outcomes listed or shown in a table (can be earned in (i))  M1 for outcomes giving a total of less than 5  eg 6 total outcomes, outcomes listed or identified in table  A1  oe  C1 (dep M2) for conclusion that Savio is incorrect with supportive evidence (including clear reference to their P(5 or more) or comparison of P(less than 5) with ¼ oe). |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | |
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 7 | (a) | 7 4÷2 | 14 | 2 | M1 for 7 x 4÷2  A1 cao |
|  | (b) |  | Pair of numbers with product 4  eg 1,14 or 2,7 | 2 | ft B2 correct pair  (B1 one correct dimension seen unless clearly working with perimeter not area) |
| 8 | (i) |  |  | 1 | B1  oe |
|  | (ii) | + |  | 3 | M1 for or  M1 for + or 1+ 9 (=10)  A1 oe  Note:  Award 0 marks for without working in (ii)  if seen in (i) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | |
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 9 | (a) | 2 –1 0 1 2 3 4  1 3 5 7 9 11 13  Or  Using *y* = *mx* + *c*, gradient =2,  *y* intercept = 5 |  | 3 | **(Table of values)**  M1 for at least 2 correct attempts to find points by substituting values of *x*  M1 (dep) ft for plotting at least 2 of their points (any points plotted from their table must be correct)  A1 for correct line between -2 and 4  **(No table of values)**  M2 for at least 2 correct points (and no incorrect points) plotted OR  line segment of *y* −2*x* = 5 drawn (ignore any additional incorrect segments)  (M1 for at least 3 correct points with no more than 2 incorrect points)  A1 for correct line between -2 and 4  **(Use of *y*=m*x*+c)**  M2 line segment of *y* −2*x* = 5 drawn (ignore any additional incorrect segments)  (M1 for line drawn with gradient of 2 OR line drawn with a *y* intercept of 5 and a positive gradient)  A1 for correct line between -2 and 4 |
|  | (b)(i) |  | 4 |  | B1 Allow 3.8 to 4.2 inclusive either by substitution  or ft from a straight line segment (± 2mm) |
|  | (ii) |  | 1.6 |  | B1 Allow 1.4 to 1.8 inclusive either by substitution  or ft from a straight line segment (± 2mm)  Note: Condone alternative or additional value  − 1.4 to − 1.8 inclusive ft from straight line segments |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | |
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 10 | (a) |  | 4 | 1 | B1 cao |
|  | (b) |  | 7 or (0,7) | 1 | B1 cao |
| 11 |  |  | Or  90 – | 2 | M1 for 180 – *x* seen (eg 180 – *x* ÷ 2)  A1 correct expression |
| 12 | (a) |  | 3*x*(*x*–2) | 2 | B2 3*x*(*x*–2)  (or B1 for partial factorisation 3(*x*2–2*x*) or *x*(3*x*–6) ) |
|  | (b) | 6*y* + 21 + 4*y* – 20 = 10*y* + 1 | 10*y* + 1 | 2 | M1 3 × 2*y* + 3 × 7 or 4 × *y –* 4 × 5 or 10*y*  A1 cao |
|  | (c) | 12 = 5*x* – 10 | 4.4 or 4 or | 3 | M1 one correct manipulation either 5*x* – 10  or  M1 for intention to add 10 to both sides  Or intention to add 2 to both sides eg 12 + 10 = 5*x*  or + 2 = *x*  A1 4.4 or oe |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | |
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 13 |  |  | Q R    7 1 4 6  3    2  5 | 4 | M1 for an attempt at classification, eg by writing Q in an appropriate shape or writing an appropriate shape number next to set Q  M1 for correct placement of any shape number in the Venn diagram.  A1 for all shape numbers in sets Q and R correctly placed  A1 for 2 and 5 outside of Q and R  SC B2 for giving total number of elements in each part of Venn diagram:    Q R  1 2 2    2  SC B1 for:    Q R  3 2 4    2 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | | |
| **Question** | | | **Working** | **Answer** | **Mark** | **Notes** |
| 14 | (a) | 4 by 8 | | 32 | 1 | B1 cao |
|  | (b) |  | | 2*n*2 | 2 | M1 for quadratic expression in *n*  A1 for 2*n*2 oe |
|  | (c) | 2002=100,= 10 | | Yes and reason | 2 | B2 for yes and 10 × 20=200 or 2 × 102 = 200  or  = 10 or completes sequence up to and including 200  (B1 for using 2*n*2 oe or 50 and 72 seen or statement that 200 is 10th term) |
| 15 | (a) | 30+70+80=180  Angles are the same | | Yes and reason | 2 | M1 sight of 30,70,80 (from angles in triangle add to 180)  A1 (dep on award of M1) Angles are the same |
|  | (b) |  | | 13.5 | 2 | M1 6/4 oe scale factor seen  or 4/6 oe scale factor seen |
|  |  |  | |  |  | A1 cao |
| 16 |  | 47000, 4700, 0.407, 47  0.407, 47, 4700, 47000  407 x 10–3, 0.47 x 102 , 4700,  4.7 x 104 | | 407 x 10–3, 0.47 x 102 , 4700,  4.7 x 104 | 2 | M1 Converting all to same form  A1 Fully correct ordering of numbers in standard form  (SC B1 if one incorrectly placed or all 4 in reverse order) |
| 17 |  |  | |  | 3 | B1 (*x* –3)(*x* + 3)  B1 (*x* –3)(*x* + 4)  B1 |
| **5MM1H\_01** | | | | | | |
| **Question** | | | **Working** | **Answer** | **Mark** | **Notes** |
| 18 | (a) | | 180–90–34=56  90–56=34 | *x*=34°  Reason | 2 | B1 34°  B1 for Alternate segment theorem  Or  B1 34°  B1 for all reasons:  Angles in a semicircle are 90°  Angles in a triangle add up to 180°  The tangent to a circle is perpendicular (90°) to the radius (diameter) |
|  | (b) | | 130/2=65  90–65=25° | 25°  Reasons | 4 | M1 for 90 – 130/2  A1 cao  C2 for both reasons  The angle at the centre of a circle is twice the angle at the circumference.  Angles in a semicircle are 90°  (C1 for one reason) |
| 19 | (a) | |  | 1 | 1 | B1cao |
|  | (b) | |  |  | 1 | B1cao |
|  | (c) | |  | 9 | 2 | M1 for 3² or ( )2 or  A1 cao |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | |
| **Question** | | **Working** | **Answer** | **Mark** | **Notes** |
| 20 |  |  | Proof shown | 3 | M1 For expressing a general pair of two odd numbers algebraically  eg 2*n*+1, 2*m*+1  or 2*n*–1, 2*m*–1  or 2*n*–1, 2*m*+1  or  For expressing a pair of two consecutive or identical odd numbers algebraically  eg 2*m*+1, 2*m*+3  or 2*n*–1, 2*n*+1  or 2*n*+1, 2*n*+1  M1 (dep) for showing addition of 2 algebraic expressions which are a general pair of 2 odd numbers , not a consecutive pair eg 2*n*+1 + 2*m*+1s  A1 Simplified expression for sum eg 2*n* + 2*m* + 2 and correct reasoning that it is divisible by 2  eg 2*n*+2*m*+2 is divisible by 2  or 2 is a factor of 2*n*+2*m*+2  or 2(*n* + *m* + 1)  SC B1 for using 2 different variables (eg *m* and *n*) which are defined as even and then used to form expressions for 2 general odd numbers eg *n*+1 and *m*+1 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **5MM1H\_01** | | | | | | |
| **Question** | | **Working** | | **Answer** | **Mark** | **Notes** |
| 21 | (a) | 1 – | |  | 1 | B1 oe |
|  | (b)(i) | Tree diagram or | |  | 5 | B1 for or  seen  M1 Indication of correct 2 branches from a tree diagram leading to seen  A1  Or  B1 or seen  M1 2  A1  **Alternative Scheme - Without Replacement**  B1 for or seen  M1 Indication of correct 2 branches from a tree diagram leading to  seen  A0 for |
| **5MM1H\_01** | | | | | | |
| **Question** | | **Working** | | **Answer** | **Mark** | **Notes** |
| 21 | (ii) | ×  +  ×  +  ×  +  ×  +  ×  +  +  ×  +  or  1 –  × | |  |  | M1 adding at least 3 of the 5 products for correct combinations with at least one white  A1 for  Alternative  M1 1 –  A1 for |
|  |  |  | |  |  | **Alternative scheme – without replacement**  M1 adding at least 3 of the 5 products for correct combinations with at least one white  ×  +  ×  +  ×  +  ×  +  ×  A0 for  Alternative  M1 1 –  ×  A0 for |
| **5MM1H\_01** | | | | | | |
| **Question** | | **Working** | **Answer** | | **Mark** | **Notes** |
| 22 | (a) |  |  | | 2 | M1  A1 cao |
|  | (b) | 2++ 2+  2++ 2+  2+5  + 4+10 | 6+15 | | 4 | M1 for 3 of no more than 4 correct terms of expansion, (may be shown in a table or without + signs)  2 +  + 2 +  oe  M1 or  or  or  or  M1 5  or 10 or 4  A1 cao |
| 23 | (a) | (*x*–8)(*x*+2) | 8 or –2 | | 3 | M1 for (*x ±* 8)( *x ±* 2)  A1 for 8  A1 for –2  (Note: If trial and improvement used, both answers must be correct for award of marks) |
|  | (b) | *x* + 2 = 8  *x* + 2 = –2  *x*2 + 4*x* + 4 – 6*x* – 12 – 16 = 0  *x*2 – 2*x* – 24 = 0  (*x*–6)(*x*+4) | 6 and –4 | | 2 | M1 for *x* + 2 = 8 or *x* + 2 = –2  A1 both 6 and –4 cao  Or  M1 for multiplying out the brackets to give  *x*2 + 4*x* + 4 – 6*x* – 12 – 16 = 0 oe  A1 both cao |

Further copies of this publication are available from

3_country_ofqual_without_curve_final

Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email publication.orders@edexcel.com

November 2011

For more information on Edexcel qualifications, please visit

www.edexcel.com/quals

Pearson Education Limited. Registered company number 872828   
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE